

We claim:

1. A roll, comprising a polyurethane elastomer formed from a polyurethane mixture, wherein the polyurethane mixture comprises polydiene, tri-functional polyol curative, an additional graft polymer curative having a molecular weight of at least about 800 and comprising diol, polyol, diamine, polyamine or a combination thereof,
5 conductive modifier, hydrolytic stabilizer, and, optionally, antioxidant.
2. The roll according to claim 1, wherein the polyurethane mixture further comprises a urethane prepolymer.
3. The roll according to claim 2, wherein the roll is a developer roll.
4. The roll according to claim 2, wherein the polydiene is polydiene diol or polydiene prepolymer.
5. The roll according to claim 2, wherein the urethane prepolymer comprises polycaprolactone ester toluene diisocyanate prepolymer.
6. The roll according to claim 4, wherein the polydiene diol comprises polybutadiene diol.
7. The roll according to claim 2, wherein the additional graft polymer curative comprises a diol.
8. The roll according to claim 7, wherein the diol comprises at least one acrylate, silicone, polyether or polyester side chain.
9. The roll according to claim 2, wherein the conductive modifier is selected from the group consisting of ferric chloride, ferrous chloride, calcium chloride, cobalt hexafluoroacetylacetonate and combinations thereof.
10. The roll according to claim 2, wherein the conductive modifier comprises ferric chloride.
11. The roll according to claim 2, wherein the hydrolytic stabilizer comprises triisopropanolamine.

12. The roll according to claim 2, exhibiting a Shore A hardness of less than about 50 according to ASTM D2240-86 and a compression set of less than about 8% according to ASTM D395-89, method B, at a temperature of about 70°C for about 22 hours.

13. An image forming device comprising a roll as recited in claim 1.

14. The image forming device according to claim 13, wherein the image forming device comprises an electrophotographic printer.

15. A developer roll for an image forming device, comprising a polyurethane elastomer formed from a polyurethane mixture, wherein the polyurethane mixture comprises polycaprolactone urethane prepolymer, polybutadiene diol, tri-functional polyol curative, a grafted diol curative having a silicone side chain, conductive modifier
5 comprising ferric chloride, hydrolytic stabilizer comprising triisopropanolamine, and antioxidant comprising 2,6-di-tertiarybutyl-4-methyl-phenol, wherein the developer roll exhibits a Shore A hardness of less than about 50 according to ASTM D2240-86 and a compression set of less than about 5% according to ASTM D395-89, method B, at a temperature of about 70°C for about 22 hours.

16. A method of manufacturing a roll, comprising:

a) casting a polyurethane mixture into a mold, the polyurethane mixture comprising polydiene, tri-functional polyol curative, an additional graft polymer curative having a molecular weight of at least about 800 and comprising diol, polyol,
5 diamine, polyamine or a combination thereof, conductive modifier, hydrolytic stabilizer, and, optionally, antioxidant.

b) curing the polyurethane mixture to allow demolding of a resulting roll;

c) demolding the roll and, optionally, post-curing the demolded roll;

d) grinding the roll to desired dimensions; and

10 e) baking the roll under conditions sufficient to oxidize an outer layer of the roll.

17. The method according to claim 16, wherein the polyurethane mixture further comprises a urethane prepolymer.

18. The method according to claim 17, wherein the urethane prepolymer comprises polycaprolactone ester toluene diisocyanate prepolymer.

19. The method according to claim 17, wherein the polydiene is polydiene diol or polydiene prepolymer.

20. The method according to claim 19, wherein the polydiene diol comprises polybutadiene diol.

21. The method according to claim 17, wherein the additional graft polymer curative comprises a diol.

22. The method according to claim 21, wherein the diol comprises at least one acrylate, silicone, polyether or polyester side chain.

23. The method according to claim 17, wherein the conductive modifier is selected from the group consisting of ferric chloride, ferrous chloride, calcium chloride, cobalt hexafluoroacetylacetonate and combinations thereof.

24. The method according to claim 23, wherein the conductive modifier comprises ferric chloride.

25. The method according to claim 17, wherein the hydrolytic stabilizer comprises triisopropanolamine.

26. The method according to claim 17, wherein the antioxidant comprises 2,6-di-tertiarybutyl-4-methyl-phenol.

27. The method according to claim 17, wherein the roll has a hardness of less than about 50 Shore A according to ASTM D2240-86 and a compression set of less than or about 8% according to ASTM D395-89, method B, at a temperature of about 70°C for about 22 hours.

28. The method according to claim 17, wherein the outer layer has a resistivity from about 5.0×10^9 ohm-cm to about 2.0×10^{12} ohm-cm.

29. A method of manufacturing a roll, comprising:

- a) casting a polyurethane mixture into a mold, the polyurethane mixture comprising polycaprolactone urethane prepolymer, polybutadiene diol, tri-functional polyol curative, a grafted diol curative having a silicone side chain, conductive modifier
5 comprising ferric chloride, hydrolytic stabilizer comprising triisopropanolamine, and antioxidant comprising 2,6-di-tertiarybutyl-4-methyl-phenol, wherein the developer roll exhibits a Shore A hardness of less than about 50 according to ASTM D2240-86 and a compression set of less than about 5% according to ASTM D395-89, method B, at a temperature of about 70°C for about 22 hours.
- 10 b) curing the polyurethane mixture to allow demolding of a resulting roll;
- c) demolding the roll and, optionally, post-curing the demolded roll;
- d) grinding the roll to desired dimensions; and
- e) baking the roll under conditions sufficient to oxidize an outer layer of the roll, wherein the outer layer has a resistivity from about 5.0×10^9 ohm-cm to about $2.0 \times$
15 10^{12} ohm-cm.